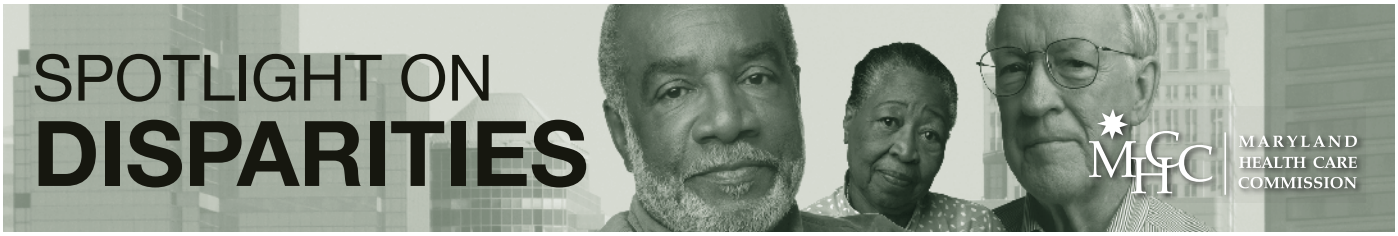


Differences in Hospitalizations for Ambulatory Care Sensitive Conditions Among Maryland Medicare Beneficiaries–2006

Analysis of Maryland Medicare claims data showed significant differences in rates of ACSC-related hospitalizations by race and gender that were only partially explained by disease burden or socioeconomic and geographic factors. Rates also varied significantly by jurisdiction when controlling for differences in population characteristics. The differences in rates may be attributable, at least in part, to the performance of outpatient systems and suggest that opportunities exist for improving outcomes through enhancements in quality of care.

Hospitalization for ambulatory care sensitive conditions (ACSCs)—conditions for which timely and appropriate outpatient care could prevent many hospitalizations—is a frequently used marker for the quality of the outpatient care system. The performance of outpatient care systems can be affected by both the quality of care delivered by individual providers and system-level factors that affect patients' access to care. The Maryland Health Care Commission (MHCC) conducted this study to provide Maryland policymakers, providers, and community organizations with information to document demographic and geographic differences in ACSC-related hospitalizations. High rates of ACSC-related hospitalizations may indicate problems with the quality of care in outpatient health care systems. Differences in rates between different groups could arise from inequities in the quality of care, although differences in disease burden and other factors are also likely to play a role. Examination of trends in ACSC outcomes and understanding the underlying contributing factors can help target interventions to improve outpatient care.

TABLE 1. ACSC Hospitalization Rates and Costs Among Maryland Medicare Beneficiaries[a], 2006

	Number of Hospitalizations [b]	Rate per 1,000 Maryland Medicare Beneficiaries [b]	Total Costs [b] (in millions)	Median Costs per Hospitalization
All Analyzed ACSCs	38,229	67	$323.2	$5,957
Congestive Heart Failure	12,715	22	$119.9	$6,639
Bacterial Pneumonia	7,312	13	$62.5	$6,267
Urinary Tract Infection	4,526	8	$32.1	$5,437
COPD	4,472	8	$35.8	$5,821
Dehydration	3,031	5	$19.2	$4,810
Diabetes	2,968	5	$33.2	$6,507
Adult Asthma	1,761	3	$13.0	$5,452
Hypertension	898	2	$5.0	$4,046
Angina	552	1	$2.6	$3,624

[a] Excludes beneficiaries under 65.

[b] The sum of the number, rate, and costs of hospitalizations across all conditions may be greater than that for "All Analyzed ACSCs" because an individual stay record may account for more than one condition.

The Spotlight examines rates of ACSC hospitalizations for selected racial, demographic, and socioeconomic groups of Medicare beneficiaries in 2006. Rates are calculated as the number of hospitalizations for selected ACSCs per 1,000 Medicare beneficiaries ages 65 and older. The rates are constructed as population-based measures, calculated among all beneficiaries, rather than just among beneficiaries with ACSCs. The analysis was conducted using Medicare claims and enrollment data supplemented with income projections for Maryland jurisdictions from the 2000 U.S. Census. All rates are standardized for age and gender differences except when stratified by these categories. Where indicated, selected results are adjusted for additional factors, including geographic location, income, and/or prevalence of disease. A complete description of the study, including the study methodology, can be found on the MHCC website at http://mhcc.maryland.gov/spotlight/index.html.

Findings

ACSC HOSPITALIZATIONS IN MARYLAND

ACSC hospitalizations account for a considerable share of Maryland Medicare hospitalizations and spending. In 2006, hospitalizations for the nine ACSCs included in this analysis accounted for approximately 38,000 hospitalizations among Medicare beneficiaries and $323 million of Medicare and beneficiary outlays.[1] These hospitalizations represented an estimated 15 percent of all Medicare hospital stays in Maryland, 13 percent of all Medicare Part A hospital spending, and 17 percent of beneficiary hospital cost sharing.

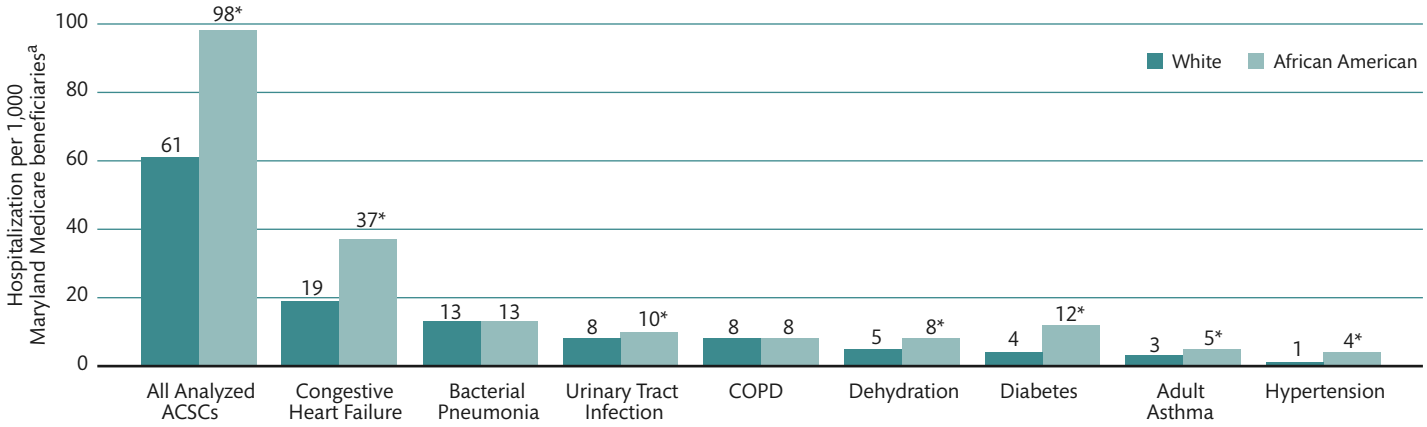
Three of the nine ACSCs studied—congestive heart failure (CHF), bacterial pneumonia, and urinary tract infection (UTI)—accounted for about two-thirds of the ACSC hospitalizations and their associated costs. Hospitalizations for CHF represented 33 percent of ACSC hospitalizations and 36 percent of ACSC hospital spending (Table 1). CHF hospitalizations also had the highest average cost ($6,639) per hospitalization. Bacterial pneumonia and UTI together accounted for an additional 31 percent of ACSC hospitalizations and 29 percent of the ACSC hospital spending.

RACIAL DIFFERENCES IN ACSC HOSPITALIZATION RATES

African American beneficiaries had significantly higher hospitalization rates than White beneficiaries. African American beneficiaries had significantly higher rates of ACSC hospitalizations related to CHF, UTI, dehydration, diabetes, adult asthma, and hypertension than White beneficiaries, and there were no significant differences for two conditions: chronic obstructive pulmonary disorder (COPD) and bacterial pneumonia (Figure 1). For all ACSC hospitalizations combined, African American beneficiaries had an age-gender adjusted hospitalization rate of 98 per 1,000 beneficiaries, while White beneficiaries had a hospitalization rate of 61 per 1,000 beneficiaries.

The racial differences in age-gender adjusted rates were largest for CHF, diabetes, and hypertension. For these three conditions, African American beneficiaries had a hospitalization rate at least two times higher than that for White beneficiaries (Figure 1). The CHF hospitalization rate was 37 hospitalizations

FIGURE 1. ACSC Hospitalization Rates by Race, Selected Conditions, Age-Gender Adjusted, 2006



[a] Excludes beneficiaries under 65.

* Statistically significant difference between White and African American beneficiaries at $p \leq 0.05$.

per 1,000 African American beneficiaries in comparison to 19 hospitalizations per 1,000 White beneficiaries. The diabetes hospitalization rate was 12 hospitalizations per 1,000 African American beneficiaries and 4 hospitalizations per 1,000 White beneficiaries. Finally, the hypertension hospitalization rate was 4 hospitalizations per 1,000 African American beneficiaries and one hospitalization per 1,000 White beneficiaries.

Racial differences remain after controlling for differences in disease prevalence. One key factor that may explain racial differences in hospitalization rates is the underlying prevalence of disease, or disease burden. African Americans are known to have higher rates of certain disease conditions than Whites, which may explain observed differences in ACSC hospitalizations.[2] However, even when controlling for differences in disease prevalence for four conditions—CHF, diabetes, asthma, and hypertension—for which Maryland prevalence data was available, remaining differences which might be attributable to treatment of disease and other factors, such as access to care and physical environment, were still substantial. In particular, we found that after controlling for prevalence, rates for African Americans were between 1.8 and 2.7 times higher than rates for Whites (Table 2)—compared to 1.8 to 3.3 times higher without these adjustments. After controlling for prevalence, disparities decreased the most for diabetes and the ratio between African American and White beneficiary hospitalization rates decreased from 3.3 to 1.9.

Income, geographic location, and demographics also explained some, but not all, racial differences. Hospitalization rates for African American beneficiaries were significantly higher than for White beneficiaries within all income categories and in all five of the largest Maryland jurisdictions (Figures 2 and 3). The ratio of African American to White admission rates increased with income. Nonetheless, African American beneficiaries in higher-income categories had substantially lower rates of all ACSC hospitalizations than either African American or White beneficiaries in the lowest-income category, indicating the potentially important role low-income status plays in ACSC hospitalizations. In other words, higher-income beneficiaries have better outcomes than those at lower income levels regardless of race.

Hospitalization rates for ACSCs were lower for both White and African American beneficiaries in higher-income Montgomery County than for those in lower-income Baltimore City. Conversely, ACSC hospitalization rates for both White and African American beneficiaries in Baltimore City were the highest among the five examined jurisdictions. At the same time the disparity in rates between White and African American rates was greatest in Montgomery County and lowest in Baltimore City.

Controlling for income, demographic, and geographic characteristics simultaneously in a multivariate regression model reduced the differences between African American and White beneficiaries' ACSC hospitalization rates for all conditions (Table 3).[3]

TABLE 2. ACSC Hospitalizations Accounting for Disease Prevalence, by Race, 2006[a]

	Prevalence[a]			Population-Based Hospitalization Rate (age-gender adjusted)			Hospitalization Rate Among Beneficiaries With ACSCs (prevalence and age/gender adjusted)		
	White	African American	AA/W Ratio	White	African American	AA/W Ratio	White	African American	AA/W Ratio
	Percent of the Population			Per 1,000 Maryland Medicare Beneficiaries[b]			Per 1,000 Maryland Medicare Beneficiaries[b] with ACSCs		
Congestive Heart Failure	12.1	12.9	1.1	19.1	36.7	1.9	158.1	284.3	1.8
Diabetes	16.3	28.7	1.8	3.7	12.0	3.3	22.4	41.7	1.9
Adult Asthma	6.8	8.8	1.3	2.7	4.9	1.8	39.3	55.7	1.4
Hypertension	56.7	69.2	1.2	1.1	3.6	3.3	1.9	5.3	2.7

[a] Prevalence was from the Maryland Behavioral Risk Factor Surveillance System, 2005–2007 and are for the Maryland population ages 65 and over. Prevalence of heart attack was used as a proxy for prevalence of congestive heart failure.

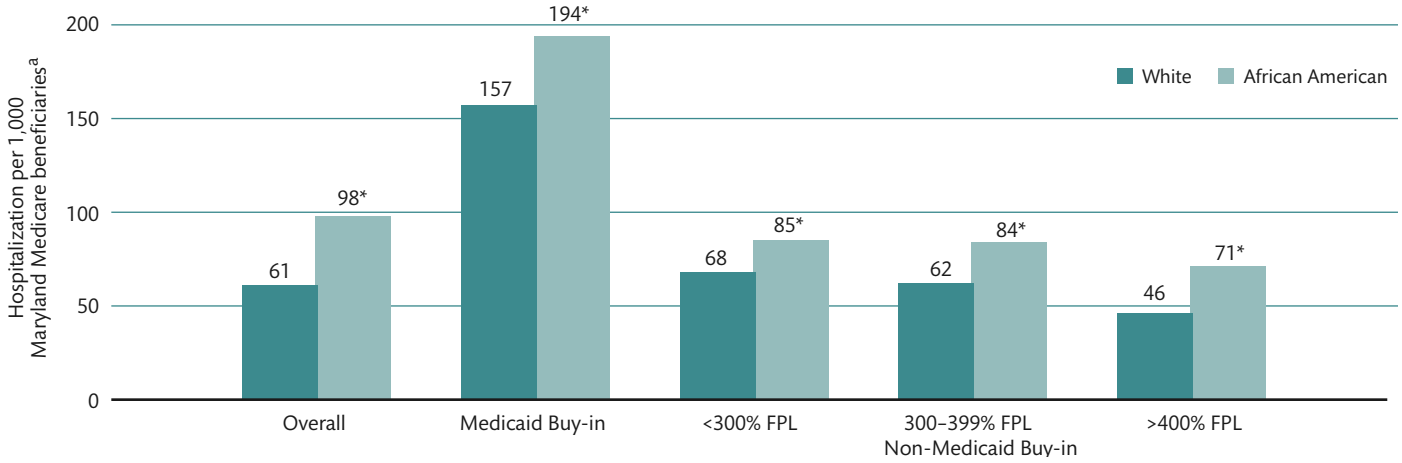
[b] Excludes beneficiaries under 65.

Substantial racial differences persisted for hospitalizations related to CHF, diabetes, and hypertension. The ratio of African American to White CHF hospitalization rates declined from 1.8 to 1.6. For hospitalizations related to diabetes and hypertension, the ratio fell from 3.2 to 2.5 and from 3.2 to 2.8, respectively.

AGE AND GENDER DIFFERENCES IN ACSC HOSPITALIZATION RATES

The rate of hospitalization increased significantly with age for all analyzed conditions. Hospitalization rates for each ACSC significantly increased with age for both men and women. For all ACSC hospitalizations combined, the hospitalization rate per 1,000 beneficiaries was 36 for those ages 65–69, 49 for those ages 70–74, 89 for those ages 80–84, and 123 for those ages 85 and older (data not shown). The range of hospitalization rates across age groups varied by ACSC condition. The conditions with the greatest age variation were CHF, bacterial pneumonia, UTI, and dehydration (data not shown). For CHF, the youngest beneficiaries had a rate of 11 hospitalizations per 1,000 beneficiaries and the oldest beneficiaries had a rate of 45 hospitalizations per 1,000 beneficiaries. For bacterial pneumonia and UTI, the range of hospitalization rate was

FIGURE 2. ACSC Hospitalization Rates by Race and Income, All Analyzed ACSCs, Age-Gender Adjusted, 2006

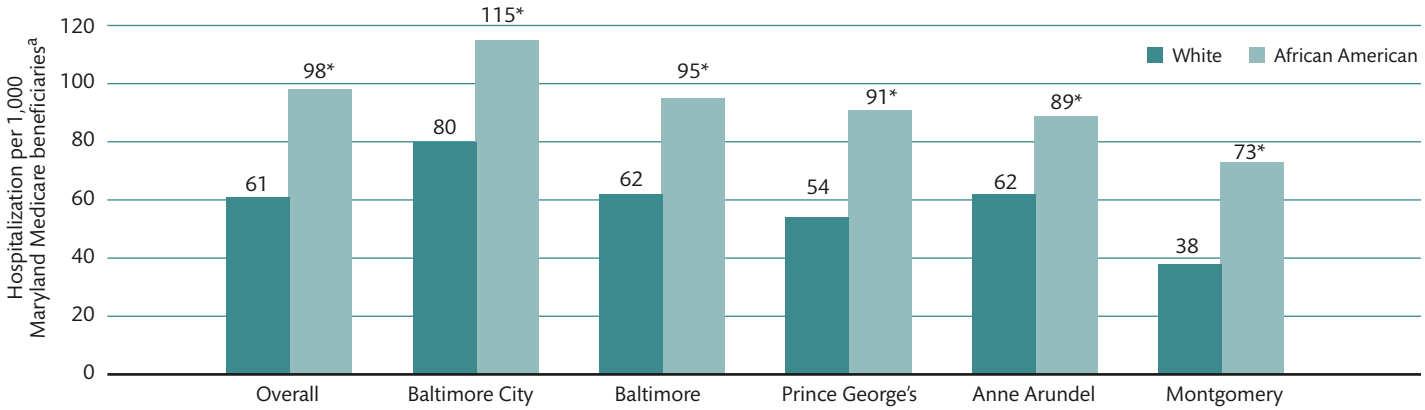


[a] Excludes beneficiaries under 65.

* Statistically significant difference between White and African American beneficiaries at $p \leq 0.05$.

Note: Income categories were developed based on whether or not beneficiaries were identified as Medicaid buy-in. For non-Medicaid buy-in beneficiaries, beneficiaries' income was further based on the median income for their zip code.

FIGURE 3. ACSC Hospitalization Rates by Race and Five Largest Maryland Jurisdictions, ACSCs, Age-Gender Adjusted, 2006



[a] Excludes beneficiaries under 65.

* Statistically significant difference between White and African American beneficiaries at $p \leq 0.05$.

6 to 25 per 1,000 beneficiaries and 2 to 20 per 1,000 beneficiaries, respectively. The rate of dehydration hospitalizations increased from 2 hospitalizations per 1,000 beneficiaries ages 65–69 to 12 hospitalizations per 1,000 beneficiaries ages 85 and older.

Older women were particularly vulnerable to hospitalizations related to UTI and hypertension. Females in every age group were more likely than males to be hospitalized for UTI, hypertension, and adult asthma (Figure 4). UTI hospitalization rates for women were over 1.5 times higher than for men in all age groups. For hypertension and asthma, women's hospitalization rates were also at least 1.4 times higher than those for men in all age groups.

Differences in rates between genders increased with age for UTI and hypertension. For UTI hospitalizations, the difference increased from 1.2 hospitalizations per 1,000 beneficiaries ages 65–69 to 9.6 hospitalizations per 1,000 beneficiaries ages 85 and older. While less drastic, the difference for hypertension increased from 0.5 hospitalizations per 1,000 beneficiaries ages 65–74 to 1.7 hospitalizations per 1,000 beneficiaries ages 85 and older. The rate differences tended to decrease with age for asthma, with the difference being 2.3 hospitalizations per beneficiaries ages 65–74 and 1.5 for beneficiaries ages 80 and older.

Older men had high hospitalization rates for bacterial pneumonia, CHF, and diabetes. Men were more likely than women to be hospitalized for bacterial pneumonia in all age groups, except those aged 65–69. Overall, the hospitalization rate for bacterial pneumonia among men was 1.3 times that for women (Figure 4). These differences increased sharply with age and ranged from 1.5 hospitalizations per 1,000 beneficiaries ages 70–74 to 8.6 hospitalizations per 1,000 beneficiaries ages 85 and older (data not shown).

In general, men also had higher hospitalization rates than women for CHF and diabetes. However, these differences were not large and were statistically significant only among older beneficiaries. Overall, male beneficiaries were 1.1 times as likely as women to be hospitalized for CHF and 1.2 times as likely to be hospitalized for diabetes (Figure 4). For beneficiaries ages 85 and older, the difference between male and female hospitalization rates was 8.4 CHF hospitalizations and 1.9 diabetes hospitalizations per 1,000 beneficiaries.

Accounting for prevalence reduced gender differences in ACSC hospitalizations and costs. Gender differences in underlying prevalence vary by disease. Males had higher rates of disease prevalence for three conditions–CHF, diabetes, and hypertension–while females had a higher prevalence for asthma

TABLE 3. Differences in ACSC Hospitalization Rates Among White and African American Beneficiaries, Regression Adjusted[a], 2006

	Unadjusted Rate		Regression Adjusted Rate		Difference in African American-White		African American/ White Ratio	
	White	African American	White	African American	Unadjusted	Adjusted	Unadjusted	Adjusted
	Per 1,000 Maryland Medicare Beneficiaries[b]							
All Analyzed ACSCs	62	93	55	72	30	17	1.5	1.3
Congestive Heart Failure	20	35	17	27	15	10	1.8	1.6
Bacterial Pneumonia	13	12	11	10	-1	-1	0.9	0.9
Urinary Tract Infection	8	9	6	6	1	0	1.2	1.0
COPD	8	8	7	6	-0	-2	0.9	0.7
Dehydration	5	7	4	5	2	1	1.4	1.3
Diabetes	4	12	4	9	8	5	3.2	2.5
Adult Asthma	3	5	2	4	2	1	1.8	1.6
Hypertension	1	4	1	3	2	2	3.2	2.8

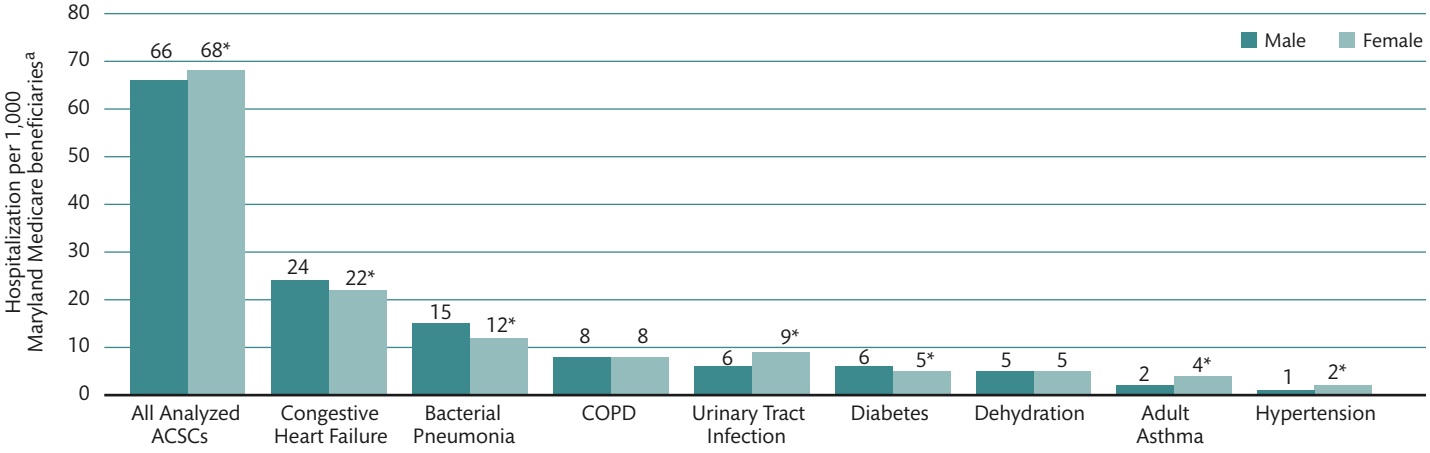
[a] Includes adjustment for age, gender, income, and jurisdiction.

[b] Excludes beneficiaries under 65.

(Table 4). As a result, controlling for disease prevalence had varying effects on ACSC hospitalizations for each condition. For diabetes and CHF, women's rates of hospitalization were lower (female-to-male ratio of 0.9) than those for men without taking prevalence differences into account. But, their rates were higher (1.1 for diabetes and 1.9 for CHF) than those for men, after adjustment for prevalence. Women had higher hospitalization rates for asthma and hypertension—before and after prevalence adjustment—with adjustments leading to no change in difference for hypertension (1.7) and a decrease in difference for asthma (from 2.0 to 1.4).

Demographic and geographic factors did not consistently explain gender differences in ACSC hospitalization rates. Controlling for other demographic (age, race, and income) and geographic (jurisdiction) characteristics in a multivariate regression model reduced differences in ACSC hospitalization rates between men and women for some conditions, including UTI and dehydration (Table 5).[4] For UTI, the ratio of female-to-male hospitalization rates was reduced from 1.9 to 1.5. For dehydration, the ratio was reduced from 1.2 to 0.9. However, for a majority of the study conditions, differences either became slightly larger (CHF, bacterial pneumonia, and diabetes) or did not change substantially (COPD, adult asthma, and hypertension).

FIGURE 4. Potentially Avoidable Hospitalization Rates by Gender, Selected Conditions, Age Adjusted, 2006.



* Statistically significant difference between White and African American beneficiaries at $p \leq 0.05$.

[a] Excludes beneficiaries under 65.

TABLE 4. ACSC Hospitalizations After Accounting for Disease Prevalence, by Gender, 2006

	Prevalence [a]			Population-Based Hospitalization Rate (age adjusted)			Prevalence Adjusted Hospitalization Rate (age and prevalence adjusted)		
	Male	Female	F/M Ratio	Male	Female	F/M Ratio	Male	Female	F/M Ratio
	Percent of the Population			Per 1,000 Maryland Medicare Beneficiaries[b]			Per 1,000 Maryland Medicare Beneficiaries[b] with ACSCs		
Congestive Heart Failure	17.1	8.1	0.5	23.7	21.6	0.9	138.5	266.2	1.9
Diabetes	22.0	17.4	0.8	5.5	5.0	0.9	25.2	28.8	1.1
Adult Asthma	5.9	8.4	1.4	2.0	3.9	2.0	33.9	46.5	1.4
Hypertension	58.7	58.5	1.0	1.1	1.9	1.7	1.8	3.2	1.7

[a] Prevalence rate was from the Maryland Behavioral Risk Factor Surveillance System, 2005–2007 and are for the Maryland population ages 65 and over. Prevalence of heart attack was used as a proxy for prevalence of congestive heart failure.

[b] Excludes beneficiaries under 65.

DIFFERENCES IN ACSC HOSPITALIZATION RATES AMONG MARYLAND'S FIVE LARGEST JURISDICTIONS

ACSC hospitalization rates varied significantly among selected Maryland jurisdictions. ACSC hospitalization rates were examined in the five largest Maryland jurisdictions (Anne Arundel County, Baltimore County, Baltimore City, Prince George's County, and Montgomery County). For all conditions, Baltimore City had the highest hospitalization rate; Montgomery County had the lowest. For all analyzed ACSCs combined, the age-gender adjusted hospitalization rate per 1,000 beneficiaries was 41 for Montgomery County and 98 for Baltimore City. For the other jurisdictions, the rate of hospitalization per 1,000 beneficiaries was 64 for Anne Arundel County, 66 for Baltimore County, and 72 for Prince George's County (Figure 5).

In general, geographic differences were consistent for all demographic subgroups. For example, regardless of age and gender, beneficiaries in Montgomery County had lower rates of ACSC hospitalizations for every condition (data not shown). The same pattern was observed when ACSC hospitalizations rates were examined by race and income. For example, African American and lower-income beneficiaries in Montgomery County continued to have considerably lower ACSC hospitalization rates than those in the other four jurisdictions.

Geographic differences were only partially explained by local population characteristics. Population characteristics appear to explain only part of the geographic variation across jurisdictions. For the five largest Maryland jurisdictions, the unadjusted rate (per 1,000 beneficiaries) for all analyzed ACSC hospitalizations was 99 for Baltimore City, 69 for Baltimore County, 67 for Prince Georges County, 62 for Anne Arundel County, and 43 for Montgomery County (data not shown). After controlling for all demographic and socioeconomic factors together, Baltimore City continued to have the highest hospitalization rates and Montgomery County the lowest ones. Controlling for demographic and socioeconomic characteristics reduced the hospitalization rate to 65 for Baltimore City and 42 for Montgomery County (Figure 5). The ACSC hospitalization rate decreased to 63 for Anne Arundel County, 58 for Baltimore County, and 60 for Prince George's County. These results suggest that other nondemographic factors, such as variation in physician practice and systems of care, may account for differences in ACSC hospitalization rates across jurisdictions. At the same time, other population differences, access to care, or environmental factors not measured by race, income, or gender differences may also explain these differences.

REDUCTION OF DIFFERENCES IN ACSC HOSPITALIZATION RATES

Reductions in ACSC hospitalizations rates can result in substantial cost savings. Reductions in ACSC hospitalizations could result in millions of dollars in cost savings to the health care system and individuals. A 20 percent annual reduction in analyzed ACSC hospitalizations would produce an estimated 7,600 avoided hospitalizations and $45 million Medicare Part

TABLE 5. Differences in ACSC Hospitalization Rates Among Male and Female Beneficiaries, Regression Adjusted, 2006

	Unadjusted Rate		Regression Adjusted Rate		Difference in Female-Male		Female/Male Ratio	
	Male	Female	Male	Female	Unadjusted	Adjusted	Unadjusted	Adjusted
	Per 1,000 Maryland Medicare Beneficiaries[a]							
All Analyzed ACSCs	62	71	59	55	8	-4	1.1	0.9
Congestive Heart Failure	22	23	20	17	1	-3	1.0	0.8
Bacterial Pneumonia	13	12	12	9	-1	-3	0.9	0.8
Urinary Tract Infection	5	10	4	7	5	2	1.9	1.5
COPD	8	8	7	7	1	-0	1.1	0.9
Dehydration	5	6	4	4	1	-0	1.2	0.9
Diabetes	6	5	5	4	-0	-1	0.9	0.8
Adult Asthma	2	4	2	3	2	2	2.0	1.8
Hypertension	1	2	1	2	1	1	1.8	1.6

[a] Excludes beneficiaries under 65.

A cost savings in 2006 (Table 6). Approximately, $38 million of the savings would be realized by Medicare and $7 million by beneficiaries through cost sharing. Annual savings would be greatest for conditions with the highest median costs that occur most frequently, including CHF at $17 million savings, bacterial pneumonia at $9 million, COPD at $5 million, and UTI at $4 million.

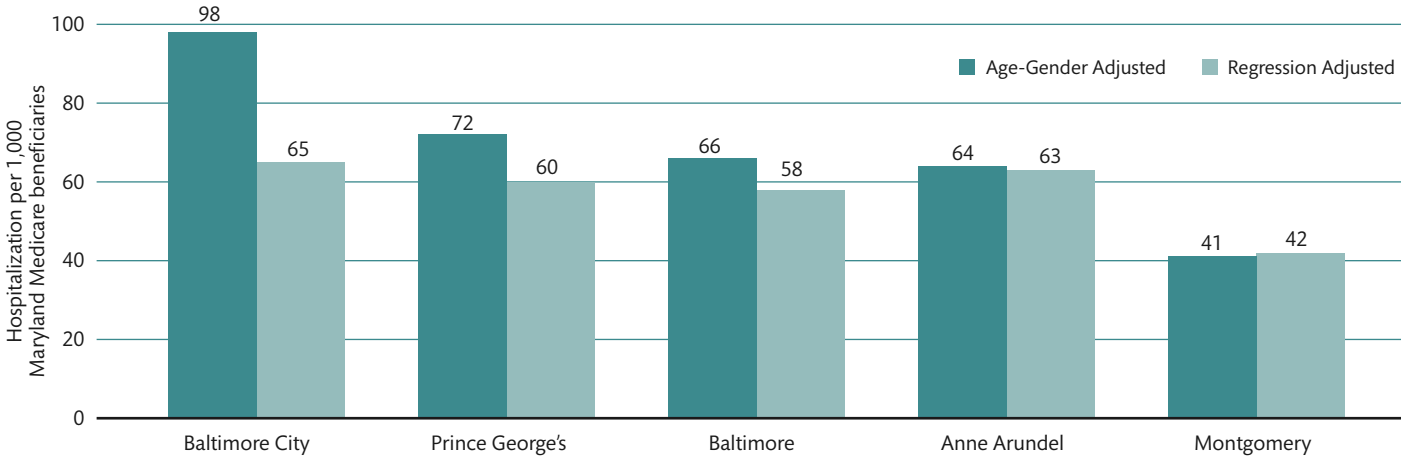
Lowering African American beneficiaries' ACSC hospitalization rates to those of White beneficiaries can also achieve substantial savings, an estimated $26 million (Table 6). These savings are associated with approximately 4,000 avoided ACSC hospitalizations. Reductions in ACSC hospitalization rate differences between racial subgroups would result in the largest savings for CHF, which had the highest median cost per hospitalization; differences in hospitalization rates between White and African American beneficiaries were the largest of all analyzed ACSC conditions. The associated savings would equal $13 million and 1,750 hospitalizations would be avoided. The reduction in disparities for diabetes hospitalizations was also associated with high annual savings, an estimated $5 million and 600 avoided hospitalizations. Although ACSC hospitalizations related to diabetes did not occur as frequently as for other conditions, the associated median costs were relatively high and the differences in rates between White and African American beneficiaries was the second largest among all analyzed ACSC conditions (Table 1, Figure 1).

IMPLICATIONS FOR ACTION

This brief highlights that racial differences are greatest for CHF and diabetes hospitalizations, while gender differences are greatest for UTI and bacterial pneumonia. Although hospitalization rates increase with age for all conditions, the rates increase dramatically for dehydration, UTI, and bacterial pneumonia. Variation in the quality of the outpatient system is likely a key factor in explaining these differences in demographic factors (other than age) in ACSC hospitalization rates. Other factors not controlled for in this analysis, such as health behaviors and social environment, may also account for these differences, but they do not diminish the important role that the variations in the outpatient system play in effecting outcomes. Given this, there are several potential interventions that can be undertaken by providers or health plans to improve outpatient care and prevent hospitalizations related to the conditions highlighted.

For CHF and diabetes hospitalizations, evidence has shown that systems of care with reduced medication error, improved care coordination, and enhanced patient education lead to fewer hospital admissions.[5,6,7] Outpatient practice electronic health care systems that house patient records and provide alerts and treatment information can help to address all three of these aspects of patient care. Having a medical home has also been shown to improve care coordination for chronic conditions, including heart disease and diabetes. In addition, building medical homes is considered a promising strategy for reducing racial and ethnic disparities in access to and quality of health care.[8]

FIGURE 5. ACSC Hospitalization Rates by the Five Largest Maryland Jurisdictions. All Analyzed ACSCs, Age-Gender Adjusted and Regression Adjusted[a], 2006



[a] Includes adjustments for age, gender, income, and race.

Proper hydration can help to reduce UTIs and dehydration. Simple interventions to increase the frequency of liquid intake in nursing home environments and at home through programs that serve older populations, such as Meals-on-Wheels, could help to reduce the rate of hospitalization related to UTI and dehydration.

Ensuring that adults receive pneumococcal polysaccharide and influenza vaccines can help to prevent bacterial pneumonia complications. These vaccines are recommended for older adults in particular, who also have the highest rates of bacterial pneumonia hospitalizations. The Centers for Disease Control and Prevention has listed on its website several strategies for increasing the rate of vaccination among adults.[9]

Although these interventions would improve ACSC hospitalization rates for all populations, this analysis shows that targeting them to populations with disproportionately higher rates can be the most effective means to improving outcomes and reducing costs. However, before choosing an intervention, more research is required to weigh the cost of implementation versus the potential cost savings.[10]

ABOUT THE PROJECT

During the State of Maryland's 2006 legislative session, House Bill 58 was passed and charged the MHCC with investigating racial and ethnic variation in quality-of-health outcomes. Keeping with the intent of the bill, MHCC commissioned this study to assess differences in ACSC hospitalizations rates among Medicare beneficiaries. Support for this project was made possible through funding from MHCC and input from the Maryland Office of Minority Health and Health Disparities. The analysis was conducted by So O'Neil, Angela Merrill, Ander Wilson, and Tim Lake from Mathematica Policy Research, Inc. A technical report with detailed tables and methods is available from MHCC. For more information, contact Linda Bartnyska, MHCC, 410-764-3570, lbartnyska@mhcc.state.md.us.

TABLE 6. Potential Annual Savings from Reductions in ACSC Hospitalizations

	2006 Part A Spending (in millions)	Savings from Overall 20% Reduction in Hospitalizations[a]		Savings from Reducing African American Rate to White Rate[b]	
		Discharges Avoided	Savings (in millions)	Discharges Avoided	Savings (in millions)
Congestive Heart Failure[c]	$119.9	2,543	$16.9	1,751	$12.5
Bacterial Pneumonia[d]	$62.5	1,462	$9.2	–	–
Urinary Tract Infection	$32.1	905	$4.9	283	$1.8
COPD[d]	$35.8	894	$5.2	–	–
Dehydration	$19.2	606	$2.9	316	$1.7
Diabetes[c]	$33.2	594	$3.9	596	$4.7
Adult Asthma[c]	$13.0	352	$1.9	155	$0.9
Hypertension[c]	$5.0	180	$0.7	253	$1.1

[a] Age-gender adjusted rates were reduced by 20 percent.

[b] Age-gender adjusted rates for African American beneficiaries were reduced to age-gender adjusted rates for White beneficiaries.

[c] Cost savings between African American and White beneficiaries include adjustments for prevalence. Prevalence information was not available for other conditions.

[d] Differences in White and African American beneficiary hospitalization rates were not statistically significant at $p \leq 0.05$.

Note: This table presents one-time annual savings from reducing hospitalizations; savings of avoided discharges are estimated using 2006 median cost per discharge. These savings do not include costs necessary to design or implement interventions to reduce hospitalizations.

Savings from reducing rates for African American beneficiaries are estimated with median cost per stay among African Americans. African Americans had lower rates than Whites for bacterial pneumonia and COPD, so savings are not estimated.

[1] The study focuses on hospitalizations for eight selected ACSCs: diabetes (a composite measure of 4 diabetes-related prevention quality indicators), chronic obstructive pulmonary disease (COPD), hypertension, congestive heart failure (CHF), dehydration, bacterial pneumonia, urinary tract infections (UTI), and adult asthma. The ninth measure is an overall measure that is a composite of the eight measures described and another prevention quality indicator related to angina.

[2] Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, CDC, 2007.

[3,4] This regression model did not adjust for prevalence differences.

[5] Medicare Payment Advisory Committee. "Promoting Greater Efficiency in Medicare." Report to Congress. Washington, DC: MedPAC, June 2007.

[6] McDonald, K.M., V. Sundaram, D.M. Bravata, R. Lewis, N. Lin, S. Kraft, M. McKinnon, H. Paguntalan, and D.K. Owens. "Care Coordination." Volume 7 of *Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies. Technical Review 9* (prepared by the Stanford University-UCSF Evidence-Based Practice Center under contract 290-02-0017), edited by K.G. Shojania, K.M. McDonald, R.M. Wachter, and D.K. Owens. AHRQ Publication No. 04(07)-0051-7. Rockville, MD: Agency for Healthcare Research and Quality. June 2007.

[7] Philips, C., S. Wright, D. Kern, et al. "Comprehensive discharge planning with postdischarge support for older patients with congestive heart failure: a meta-analysis." *JAMA* vol. 291, 2004, pp. 1358-1367.

[8] Beal, A.C., M.M. Doty, S.E. Hernandez, K.K. Shea, and K. Davis. "Closing the Divide: How Medical Homes Promote Equity in Health Care: Results From The Commonwealth Fund 2006 Health Care Quality Survey." The Commonwealth Fund, June 2007.

[9] For more information about these strategies, see http://www2.cdc.gov/vaccines/ed/whatworks/strategies_list.shtml.

[10] Examples of initiatives to address differences in health care and health can be found in the National Health Care Disparities Report and several health plan websites, such as Highmark Inc. (SilverSneakers Fitness Program). Many of these initiatives are at an early implementation stage and there is not sufficient evidence to show their effectiveness. The Robert Wood Johnson Foundation is also in the process of evaluating interventions to reduce health care disparities, including those targeting patients, providers, patient-provider communication, health care organizations, and communities; more information about these interventions can be found at http://content.healthaffairs.org/cgi/reprint/27/2/568. Aetna is comparing the effectiveness of a Culturally Competent Disease Management Program (CCDMP) and Light Support Disease Management Program (LSP) to increase the rate of clinically acceptable blood pressure measurements among Aetna-insured African American members with hypertension; more information about this study can be found at http://www.ncqa.org/Portals/0/HEDISQM/CLAS/2008_Awards/2008_Posters/Aetna.pdf.

STUDY DESIGN

Medicare enrollment and claims data were obtained by MHCC from the Centers for Medicare & Medicaid Services (CMS) under a data use agreement. Data sources included the 2006 Medicare Denominator file and Medicare Provider Analysis and Review (MedPAR) inpatient claims for Maryland residents.[1] In addition, MHCC provided median income by ZIP code for residents ages 65 and older.[2] Agency for Healthcare and Research Quality (AHRQ) Prevention Quality Indicators (PQIs) provided the specifications to develop ACSC hospitalization measures.[3, 4] Costs were calculated as the sum of Medicare and beneficiary Part A claims costs.[5] The analysis excluded beneficiaries who were in one or more of the following categories: (1) not enrolled in Medicare in January 2006; (2) enrolled in managed care; and (3) not enrolled in Medicare Part A fee for service (FFS) for all months in which they were enrolled in Medicare during the year. Rates by subgroup were adjusted to reflect the statewide age and gender distribution of eligible Medicare beneficiaries in 2006. Differences in rates were assessed using t-tests or F-tests where appropriate.

[1] The race variable on the Medicare Denominator file was derived from self-reported data on Social Security Administration forms.

[2] Income categories were developed using beneficiaries' Medicaid buy-in status and median income for those older than age 65 in a Maryland ZIP code in 2006.

[3] Of the 14 Agency for Healthcare and Research Quality (AHRQ) prevention quality indicators (PQIs), three measures were dropped because they were not relevant to the Medicare population, did not have the same denominator as the other measures, or occurred less frequently. We combined four diabetes-related measures to create a composite diabetes measure.

[4] Agency for Healthcare Research and Quality. "Guide to Prevention Quality Indicators: Hospital Admissions for Ambulatory Care Sensitive Conditions, Version 3.1." Rockville, MD: Agency for Healthcare Research and Quality, March 2007.

[5] Medicare costs included service-based payments to the hospital, "pass-thru costs"; and organ acquisition charges. Beneficiary costs are calculated as beneficiary payments for Part A Coinsurance Liability, Beneficiary Inpatient Deductible Liability, and Beneficiary Blood Deductible Liability.